

Nuclear medicine uses cutting-edge technology to diagnose and treat cancer effectively and efficiently. Advanced, accurate and safe, it is one of the most exciting, innovative areas of medicine, and is at the forefront of cancer treatment. How does it work, what can it achieve and how does it support Europe's health objectives?

Nuclear medicine: How it saves lives

A JOURNEY OF DISCOVERY AND HEALING

Nuclear medicine may sound like a recent technology, but the science is far from new.

Its origins lie in the discovery of radium therapy by **Marie Curie** and other pioneering atomic research. Radioactive isotopes were used for medical purposes in the 1930s with radioiodine treating thyroid disorders.

By the 1950s, scintillation cameras could visualise radioactive isotopes in the human body. Diagnostic imaging was used to detect and diagnose various diseases, including cancer. The 1980s saw the emergence of **single-photon emission computed tomography (SPECT)** to show physiological processes as well as anatomical structures. Since 2000, **positron emission tomography (PET)** and molecular imaging have used radiotracers to visualise metabolic processes.

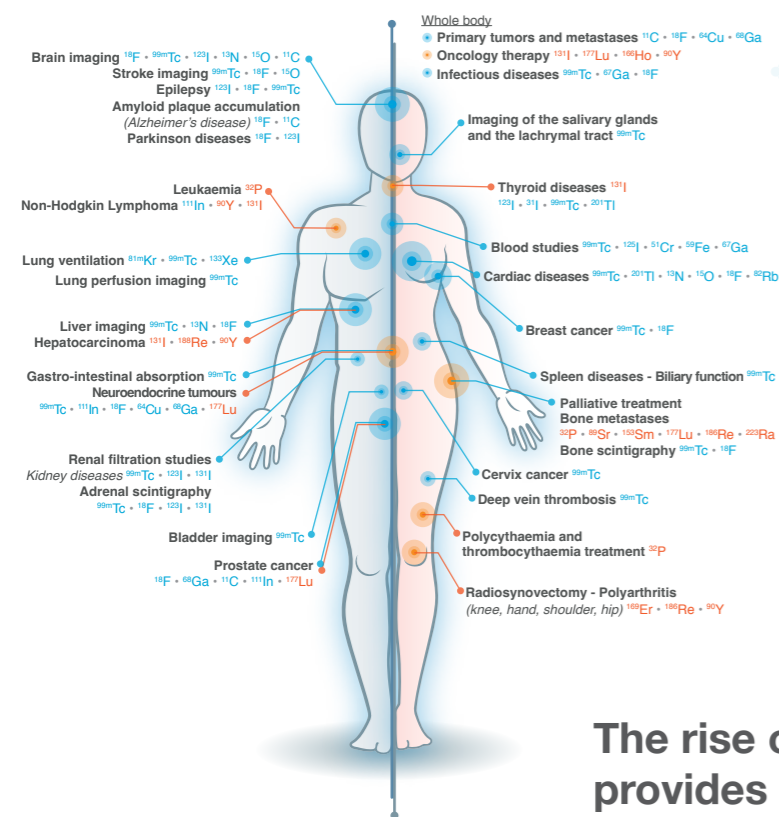
Nuclear medicine is now more precise and sophisticated than ever. It continues to evolve with radiopharmaceutical developments, imaging technology and personalised medicine, while artificial intelligence and machine learning are expected to enhance image interpretation and patient care.



HOW DOES IT WORK?

Today's nuclear medicine uses radiopharmaceutical markers to capture physiological or pathological processes. These markers are short-lived radioactive elements that emit a photon or a positron. PET and SPECT medical devices detect these particles to create accurate, real-time images of internal processes.

Coupled with anatomic imaging systems like CT or MRI, **nuclear medicine gives doctors precision tools to diagnose and treat** Europe's most critical health issues: cancer, heart conditions and neurodegenerative diseases – as well as neurology and other medical areas.



The rise of nuclear medicine provides safer and more efficient cancer treatments.

It also helps doctors **prioritise therapy needs**, ensuring that the eventual treatment decisions are based on more informed criteria. And it will help the emerging field of personalised medicine customised for individual patients.

Nuclear medicine has a worldwide impact, benefitting some **40 million patients annually**.

More than 100,000 patients are diagnosed and treated with medical isotopes each day.

Over the past 30 years, more than **one billion patients** have been imaged with the fluorine-18 radioisotope.

HOW CAN NUCLEAR MEDICINE HELP EUROPE?

Nuclear medicine is a booming sector and a growing employer. About **12 million nuclear medicine procedures are performed in Europe every year**, with demand expected to grow by more than 30% per year over the next 10 years.

It is also an area where **Europe has a technological lead**, with many of the world's best research and strongest companies based here. We have the manufacturing tools, reactors and accelerators, as well as the cameras for imaging. And we have the expertise in hospitals and industry.

This will help the European Union as it addresses key health challenges, including cancer. The **Europe's Beating Cancer Plan**, the EU programme to treat and defeat the condition, says cancer prevention, treatment and care should be built on new technologies.

Nuclear Medicine adds strength to Europe's Beating Cancer Plan

This is echoed by the European Parliament: its Special Committee on Beating Cancer (BECA Committee), set up in 2020, also underlined the importance of innovation.

Meanwhile, the Strategic Agenda for Medical Ionising Radiation Applications (SAMIRA), adopted in February 2021, is the EU's first comprehensive action plan for safe, high quality and reliable radiological technology.

HOW CAN EUROPE HELP NUCLEAR MEDICINE?



If the EU is to beat cancer, **it will need diagnostic and therapeutic technologies like nuclear medicine**, with its capacity for early detection and timely treatments.

However, key issues must be addressed if nuclear medicine is to fulfil its promise. They include **adapting healthcare systems** to cope with the growing demand for nuclear medicine, ensuring **equal access to equipment and procedures** across the EU, and **guaranteeing the supply** of radioisotopes.



The most pressing issue, though, is **to adapt regulations** to take account of nuclear medicine. Medicinal product and radioprotection regulations in Europe are not aligned, depending on two different authorities at the EU and national levels. This uncertainty hampers innovation and investment. That is why there needs to be comprehensive recognition by the EU of the unique character of the nuclear medicine sector.

Nuclear Medicine Europe (NMEU), which represents radiopharmaceutical and imaging equipment companies, engages closely with the **European Commission**, the **European Parliament** and other key bodies like the European Medicines Agency (EMA).

We work actively to raise awareness of the sector's needs. While we are growing, **we need support to help European healthcare**.

Nuclear medicine is a vital technology. It is at the forefront of science and healthcare. It helps doctors find previously undetectable disorders. And it provides remedies for previously untreatable conditions.

In short, nuclear medicine saves lives.